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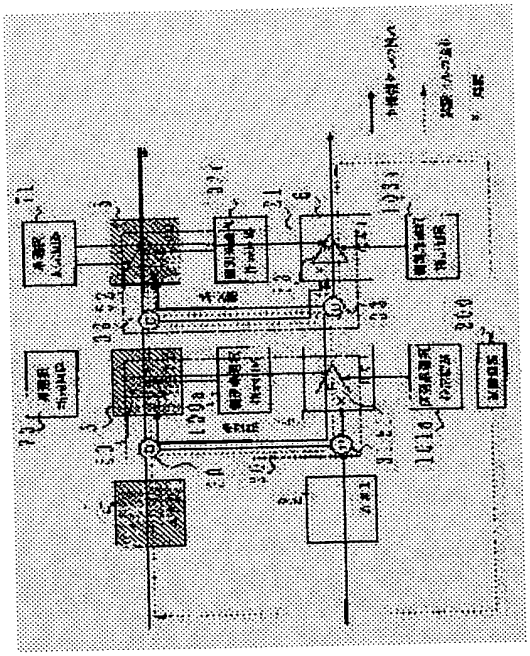
(54) TEST SYSTEM FOR ATM EXCHANGE AND ATM NETWORK

(57)Abstract:

PURPOSE: To improve the reliability and performance of an ATM exchange and an ATM network by efficiently testing active and reserve systems.

CONSTITUTION: Concerning the test system for ATM exchange and ATM network composed of that ATM exchange or the like provided with plural function blocks 1-6 made redundant into the active and reserve system so as to transfer cells and plural system crossings 20 and 21 for performing path setting between the respective function blocks, this system is provided with first system crossing control parts 101 and 103 for setting a path between the respective function blocks of the reserve system independently of the path of the active system by controlling the system crossings 20 and 21, and a test circuit 200 for performing the cell conduction test of the reserve system to which path setting is performed based on the control of these first system crossing control parts 101 and 103, and the reserve system is tested while providing service at the active



system.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] the trial system of the ATM switching system and ATM network with which this invention performs the transfer by the Asynchronous Transfer Mode (Asynchronous TransferMode, the following, ATM, and publication) -- being involved -- especially -- present -- business -- it is related with the trial system of a suitable ATM switching system to perform efficiently the trial of the ATM switching system redundancy-ized by the system and the reserve system and an ATM network, and an ATM network.
[0002]
[Description of the Prior Art] In broadband ISDN (Integrated Services DigitalNetwork, service synthesis digital communication network), the transfer technique of the information by ATM is proposed [page / 177th] like a publication from the 168th page of "guidance of a Nikkei communication separate volume ISDN activity" (1988, Nikkei Business Publications issue), for example. At this ATM, a break and 5 bytes of header are added to 48-byte length (48x8 bits), information is made a total of 53 bytes of ATM format, and is cel-ized, and informational multiplexing, discernment, distribution, routing, etc. are performed by the ATM switching system based on the header of this cel. each functional block which transmits cels, such as multiplexing of such information, and discernment, distribution, routing, to an ATM switching system -- present -- business -- it redundancy-izes in a system and a reserve system, and prepares in them -- having -- present -- business -- at the time of the failure of a system, it changes to a reserve system and a cel is transmitted.
[0003] Drawing 10 is the explanatory view showing the example of a configuration and actuation of the redundancy-ized conventional ATM switching system. Functional block (A#0, A#1, B#0, B#1, C#0, C#1, and a publication among drawing) 1-6 which this example shows the connection configuration between each functional block of the ATM exchange inside of a plane with the common former, and constitutes an ATM switching system is redundancy-ized, respectively, and the system confoundings 20 and 21 are arranged between each functional block 1-6. The distribution sections 30-33 for these system confoundings 20 and 21 to transmit a cel to functional block of the downstream of a both system from each ** of upstream functional block (the inside of drawing, D, and publication), It consists of confounding selectors (S and a publication among drawing) 50-53 for choosing the cel inputted from one of the cels transmitted from upper functional block of a both system of arbitration (pass setup), and system selection directions circuits 70 and 71. With the system change of the functional block 1-4 of each upstream, the system selection directions circuits 70 and 71 control the confounding selectors 50-53, respectively so that each ** of the functional block 3-6 of the downstream chooses the cel style from the same system of functional block of the upstream. namely, functional block of the downstream at the time of observing information data flow -- present -- business -- a system and a reserve system -- it is both the device which chooses functional block of the upstream of the same system through the system confoundings 20 and 21.
[0004] Here, a trial cel is inserted to functional block 1 and 2, functional block 5 and 6 blank-test cel are taken out, and the case where the test circuit 200 which examines the normality of switch-on in the meantime is installed is considered. in this case -- present -- business -- although a continuity check is possible for the functional block 1, 3, and 5 of a system since it connects mutually, about the functional block 2, 4, and 6 of a reserve system, it does not connect mutually and it cannot verify the normality of switch-on during employment of a system. Or it is required to examine by changing a system. Moreover, since connection of functional block of a reserve system cannot be performed also when extension of PKG which cannot carry out direct continuation of the test circuit 200 etc. is performed, you cannot perform the cel continuity check about this extension PKG without interruption of service.
[0005]
[Problem(s) to be Solved by the Invention] The trouble which it is going to solve is a point that neither trial of the cel conductivity of each functional block of the redundancy-ized reserve system of the ATM exchange inside of a plane etc. nor extension PKG which cannot carry out direct continuation of the test circuit can be examined during

employment of a system, in a Prior art. A cel continuity check, a maintenance test, etc. of a system and a reserve system are made possible. without the purpose of this invention solves the technical problem of these conventional technique and it interrupts the service under employment -- present -- business -- under prevention of failure generating by early detection of the failure potentiality-ized in the reserve system, and employment -- present -- business -- it is offering the trial system of the ATM switching system which can perform quick and detailed cause analysis by the detailed verification test to the claim from the user in a system, and an ATM network.

[0006]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the ATM switching system of this invention, and the trial system of an ATM network (1) -- present -- business -- it being redundancy-ized by a system and the reserve system and with two or more functional block which transmits a cel Are the trial system of the ATM switching system which has two or more system confoundings which perform an each setup [pass] of a between of this functional block, and a system confounding is controlled. present -- business -- independently of the pass of a system with the 1st system confounding control section the pass between each functional block of a reserve system is made to set the test circuit which performs the cel continuity check of a reserve system by which a pass setup was carried out based on control of this 1st system confounding control section -- preparing -- present -- business -- it is characterized by examining a reserve system in the service provision in a system. moreover, in the trial system of an ATM switching system given in (2) above (1), a pass setup was carried out by the system confounding -- present -- business -- a system and a reserve system -- respectively -- alike -- a test circuit -- an individual exception -- preparing -- a cel continuity check -- present -- business -- it is characterized by carrying out independently by the system and the reserve system. moreover, it is the same as that between the ATM switching systems of plurality given in (3) above (1), or of this ATM switching system -- present -- business -- between two or more transmission equipment with the redundant configuration of a system and a reserve system -- present -- business -- the trial of the normality of the cel switch-on in the reserve system of the ATM network over [connect with the transmission medium of a system and a reserve system, and] between two or more ATM switching systems or transmission equipment -- present -- business -- it is characterized by carrying out into the service provision in a system. moreover, (4) above (3) is straddled between two or more ATM switching systems or transmission equipment in the trial system of the ATM network of a publication -- present -- business -- the cel continuity check of the ATM network over [a system and a reserve system are alike, respectively, prepare the network test circuit which performs the continuity check of a cel according to an individual, and] between two or more ATM switching systems or transmission equipment -- present -- business -- it is characterized by carrying out independently by the system and the reserve system. Moreover, it sets to the trial system of an ATM switching system given in (5) above (1). Connect with functional block of the maximum upstream of a system, and functional block of the lowest style of a reserve system, and a system confounding is controlled instead of the 1st system confounding control section. a test circuit -- present -- business -- present -- business, while making the pass from functional block to functional block of the lower stream of a river of a reserve system of the upstream of a system set For every trial by the test circuit, from the functional-block side of the lowest style of a reserve system one by one the upstream of pass -- present -- business -- the 2nd system confounding control section made to be changed from a system to a reserve system -- preparing -- present -- business -- it is characterized by examining all the confounding roots from functional block to functional block of a down-stream reserve system of a system. Moreover, it sets to the trial system of an ATM switching system given in (6) above (1). All cels are transmitted to functional block of a system and a reserve system. instead of [of a system confounding and the 1st system confounding control section] -- the upstream -- present -- business -- functional block of a system to a lower stream of a river -- present -- business -- functional block of an upstream reserve system to a lower stream of a river -- present -- business -- all cels are discarded to functional block of a system, and it is characterized by preparing the 1st system confounding which sets the pass which transmits only the trial cel from a test circuit from functional block of an upstream reserve system to functional block of a down-stream reserve system. Moreover, it sets to the trial system of an ATM switching system given in (7) above (2). All cels are transmitted to functional block of a system. instead of [of a system confounding and the 1st system confounding control section] -- the upstream -- present -- business -- functional block of a system to a lower stream of a river -- present -- business -- Only the main information is transmitted to functional block of a down-stream reserve system from functional block of a system. the upstream -- present -- business -- functional block of an upstream reserve system to a lower stream of a river -- present -- business -- all cels are discarded to functional block of a system, and it is characterized by preparing the 2nd system confounding which sets the pass which transmits only the trial cel from a test circuit from functional block of an upstream reserve system to functional block of a down-stream reserve system. Moreover, between the ATM switching systems of plurality given in either of (8) above (5) to (7), or it is the same as that of this ATM switching system -- present -- business -- between two or more transmission equipment with the redundant configuration of a system and a reserve system present -- business -- the ATM network over [connect with the transmission medium of a system and a reserve system, and] between two or more ATM switching systems or transmission equipment -- present -- business -- the trial of the normality of the cel switch-on of the

confounding root from a system to a reserve system -- present -- business -- it is characterized by carrying out into the service provision in a system.

[0007]

[Function] this invention -- setting -- the control to the system confounding of the 1st system confounding control section -- a service provision sake -- present -- business -- apart from a system, the trial system which connected functional block of a reserve system is constituted. And a test circuit is connected to this trial system, and various kinds of trials containing the normal sex test of a cel transfer of each functional block of a reserve system are performed. thus -- present -- business -- without interrupting this service also in the service provision by the system, various kinds of trials, such as a maintenance test of a reserve system, can be performed, and the failure in the reserve system potentiality-ized in many cases can be detected at an early stage conventionally. moreover, a reserve system -- the same -- present -- business -- functional block of a system -- a test circuit -- connecting -- present -- business -- the trial of a system and a reserve system is performed to independent or coincidence. this -- under employment -- present -- business -- the claim on the service to functional block of a system an ACT change of as opposed to [also when generated from a user] the functional block concerned to carry out -- carrying out -- present -- business -- by examining by carrying out the state transition of the system to a reserve system the failure which was not able to be carried out occurred conventionally -- present -- business -- the detailed verification test using the testing device to a system becomes possible, and quick and detailed cause analysis to a user claim can be performed.

[0008] Moreover, various kinds of trials of a reserve system ATM within the net can be performed by constituting a communication network from two or more exchanges which prepared the 1st system confounding control section, or two or more transmission equipment of the same redundant configuration as this exchange. moreover, it can set within the net [ATM] -- present -- business -- it can set within the net [ATM] by connecting a test circuit to functional block of a system as well as a reserve system -- present -- business -- various kinds of trials of a system and a reserve system can be independently performed to coincidence.

[0009] moreover, the control to the system confounding of the 2nd system confounding control section -- the cel output section of a test circuit -- present -- business -- functional block of the maximum upstream of a system -- moreover, the cel receive section of a test circuit -- functional block of the lowest style of a reserve system -- connecting -- and functional block of the lowest style of this reserve system -- the upstream -- present -- business -- it connects with functional block of a system and the continuity check between functional block is performed in the state of this connection. then, the connection place of the upstream of functional block of the lowest style of a reserve system -- functional block of the same reserve system -- changing -- functional block of this reserve system -- the upstream -- present -- business -- it examines by connecting with functional block of a system. thus -- one by one -- the connection place of the upstream of functional block of a reserve system -- present -- business -- examining by changing from a system to a reserve system -- present -- business -- the normality of all the confounding roots from a system to a reserve system can be examined. in addition, this case -- the main information -- present -- business -- it can transmit within functional block of the both sides of a system and a reserve system.

[0010] moreover, the 1st system confounding -- present -- business -- functional block of a system to a lower stream of a river -- present -- business -- by the cel transfer root to functional block of a system all cels -- transmitting -- functional block of a reserve system to a lower stream of a river -- present -- business -- by the cel transfer root to functional block of a system all cels -- discarding -- present -- business -- all cels are transmitted by the cel transfer root from functional block to functional block of a down-stream reserve system of a system, and only a trial cel is transmitted by the cel transfer root from functional block to functional block of a down-stream reserve system of a reserve system. this -- the main information -- present -- business -- a trial cel is transmitted within functional block of a reserve system, and the verification test of the normality of the cel flow the inside of functional block of a reserve system and between [each] reserve system functional block is performed at the same time it is transmitted within functional block of the both sides of a system and a reserve system.

[0011] moreover, the 2nd system confounding -- present -- business -- functional block of a system to a lower stream of a river -- present -- business -- by the cel transfer root to functional block of a system all cels -- transmitting -- functional block of a reserve system to a lower stream of a river -- present -- business -- by the cel transfer root to functional block of a system all cels -- discarding -- present -- business -- only the main information cel is transmitted by the cel transfer root from functional block to functional block of a down-stream reserve system of a system, and only a trial cel is transmitted by the cel transfer root from functional block to functional block of a down-stream reserve system of a reserve system. The inside of functional block of the both sides of a system and a reserve system is transmitted. this -- the main information -- present -- business -- The verification test of the normality of the cel flow between functional block of the inside of functional block of a system and each system for ** is performed. and -- present -- business -- the trial cel of a system -- present -- business -- it transmits between functional block of a system -- having -- present -- business -- Moreover, the trial cel of a reserve system is transmitted to coincidence between functional block of a reserve system, and the verification test of the normality of the cel flow between functional block

of the inside of functional block of a reserve system and each reserve system is performed to it.
[0012] moreover, it can set within the net [ATM] by constituting a communication network from two or more exchanges which prepared the 2nd system confounding control-section or 1st, and 2nd system confounding, or two or more transmission equipment of the same redundant configuration as this exchange -- present -- business -- a system and a reserve system are made to cross and various kinds of trials can be performed.
[0013]
[Example] Hereafter, a drawing explains the example of this invention to a detail. Drawing 1 is the explanatory view showing the 1st example of the configuration concerning this invention of the trial system of the ATM switching system of this invention, and actuation. each functional block (A#0, A#1, B#0, B#1, C#0, C#1, and a publication among drawing) 1-6 which constitutes an ATM switching system from this example -- respectively -- present -- business -- it is redundancy-ized by the system (functional block 1, 3, and 5) and the reserve system (functional block 2, 4, and 6), and the system confoundings 20 and 21 are arranged between each functional block 1-6. The distribution sections 30-33 for these system confoundings 20 and 21 to transmit an ATM cel to functional block of the downstream of a both system from each ** of upstream functional block (the inside of drawing, D, and publication), the confounding selectors (S and a publication among drawing) 50-53 for choosing the cel inputted from one of the cels transmitted from the upper equipment of a both system of arbitration, and the system selection directions circuits 70 and 71 -- and It consists of individual system selection directions circuits 100-103 which perform control as 1st system confounding control section of this invention.
[0014] With the system change of upstream functional block, the system selection directions circuits 70 and 71 control the confounding selectors 50-53, respectively so that each ** of functional block of the downstream chooses the cel style from the same system of functional block of the upstream. The individual system selection directions circuits 100-103 concerning this invention send out an individual system selection enabling state signal and a system assignment signal to the confounding selectors 50-53 to which each ** corresponds. An individual system selection enabling state signal chooses the system directed by the system selection directions circuits 70 and 71 in a disabling condition, and each confounding selectors 50-53 choose preferentially the system directed by the individual system selection directions circuits 100-103 of the upstream, when an individual system selection enabling state signal is enabling state. thus -- present -- business -- each confounding selectors 50-53 of a system and a reserve system -- usually -- the time -- present -- functional block of the upstream of business can be chosen and functional block of the upstream of a reserve system can be chosen according to an individual if needed.
[0015] this example -- present -- business -- the system selection directions circuits 70 and 71 show the confounding selectors 50 and 52 of the functional block 3 and 5 of a system -- present -- business -- the system functional block 1 and 3 is chosen, and the confounding selectors 51 and 53 of the functional block 4 and 6 of a reserve system have chosen the functional block 2 and 4 of a reserve system which the individual system selection directions circuits 101 and 103 of the upstream which have individual system selection enabling state show. furthermore, a test circuit 200 connects with the functional block 2 and 6 of a reserve system -- having -- **** -- present -- business -- with the service provision condition in a system, the normality of these functional block 2 and 4 and the cel switch-on of the connection between six can be independently examined in the functional block 2 and 4 of two or more reserve systems, and 6. in addition -- this example -- "#0" system of each functional block -- present -- business -- although the case where it was a system was made into the example -- the system of arbitration -- present -- business -- a system -- you may be -- as the example -- zero system of functional block 1 and 5, and one system of functional block 4 -- present -- business -- the example in the case of being a system is shown in following drawing 2 .
[0016] Drawing 2 is the explanatory view showing other examples of a configuration and examples of operation concerning this invention of the trial system of the ATM switching system in drawing 1 . the ATM switching system of this example -- present -- business -- the system selection directions circuits 70 and 71 show the confounding selectors 51 and 52 of the functional block 4 and 5 of a system -- present -- business -- the functional block 1 and 4 of a system is chosen and the confounding selectors 50 and 53 of the functional block 3 and 6 of a reserve system have chosen the functional block 2 and 3 of a reserve system which the individual system selection directions circuits 100 and 103 of the upstream which have individual system selection enabling state show.
[0017] Drawing 3 is the explanatory view showing the 2nd example of the configuration concerning this invention of the trial system of the ATM switching system of this invention, and actuation. The difference with this example, and drawing 1 and the example in 2 is the point that the redundancy of the test circuits 200 and 201 arranged by the ATM switching system is carried out. this example -- setting -- present -- business -- to the functional block 1 and 5 of a system The test circuit 201 of a system is connected. present -- business -- to the functional block 2 and 6 of a reserve system By connecting the test circuit 200 of a reserve system and making actuation of each confounding selectors 50-53 the same as that of the condition which showed by drawing 1 the trial of the normality of the cel switch-on of the connection of these [the inside of each functional block 1-6, and] mutuals -- present -- business -- it can carry out to independent about a system and a reserve system, or coincidence.

[0018] Drawing 4 is the explanatory view showing the 1st example of the configuration concerning this invention of the trial system of the ATM network of this invention, and actuation. between the exchange which has the configuration which showed the ATM network of this example to drawing 1 or transmission equipment 40, and 41 -- present -- business -- it is constituted by connecting in the transmission lines 150 and 151 of a system and a reserve system. In this Fig., the exchange or transmission equipment 40, each reserve system functional block 4, 6, and 10 in 41, and the confounding selectors 51, 53, 55, and 57 for 12 have chosen each functional block 2, 4, 8, and 10 of a reserve system which the individual system selection directions circuits 101, 103, 105, and 107 of the upstream which have individual system selection enabling state show. Moreover, test circuits 200 and 202 constitute the network test circuit of this invention, a test circuit 200 generates a trial cel to functional block 2, and a test circuit 202 inspects the trial cel received from functional block 12.
[0019] thus -- present -- business -- independently of the service provision condition in a system, the normality of the cel switch-on of the connection of these [the inside of functional block of a reserve system and] mutuals can be examined ranging over the exchange or transmission equipment 40 and 41. in addition, the ATM network which consists of an ATM switching system of a configuration of that drawing 2 and drawing 3 showed although the ATM network which connected between the ATM switching systems of a configuration of that drawing 1 showed in transmission lines 150 and 151 is used in this example -- also setting -- the same -- carrying out -- the trial of a reserve system -- present -- business -- it can carry out into the service provision of a system. Explanation of operation concerning this invention in the ATM network which consists of an ATM switching system of a configuration of that drawing 3 showed by drawing 5 hereafter is performed.
[0020] Drawing 5 is the explanatory view showing the 2nd example of the configuration concerning this invention of the trial system of the ATM network of this invention, and actuation. The difference with the 1st example in drawing 4 is the point that the test circuits 200, 201, 202, and 203 which constitute the network test circuit of this invention arranged by an ATM switching system or transmission equipment 40a and 41a are redundancy-ized. this drawing 5 -- setting -- present -- business -- to the functional block 1 and 11 of a system The test circuits 201 and 203 of a system are connected. present -- business -- to the functional block 2 and 12 of a reserve system By connecting the test circuits 200 and 202 of a reserve system, and making it the same as that of the condition which showed actuation of each confounding selector by drawing 3 between ATM switching system or transmission equipment 40a and 41a -- straddling -- the trial of the normality of the cel switch-on of the connection of these [the inside of each functional block, and] mutuals -- present -- business -- it carries out to independent about a system and a reserve system, or coincidence.
[0021] Drawing 6 and drawing 7 are the explanatory views showing the 3rd example of the configuration concerning this invention of the trial system of the ATM switching system of this invention, and actuation. This example forms the individual system selection directions circuits 100a-103a which perform control as 2nd system confounding control section of this invention instead of the individual system selection directions circuits 100-103 which perform control as 1st system confounding control section of this invention in the ATM switching system of drawing 1 , respectively. drawing 6 -- setting -- the cel generating section of a test circuit 200 -- present -- business -- the functional block 1 of a system -- connecting -- moreover, the cel receive section of a test circuit 200 -- the functional block 6 of a reserve system -- connecting -- and the confounding selectors 51 and 53 of the functional block 4 and 6 of a reserve system -- directions of the system selection directions circuits 70 and 71 -- following -- present -- business -- it is in the condition which chose the functional block 1 and 3 of a system. By performing the continuity check between functional block and enabling individual system selection directions circuit 103a to that degree first, in this condition, as drawing 7 shows, it examines by changing so that the upstream functional block 4 of a reserve system may be chosen as the confounding selector 53. and functional block of the upstream of a reserve system is chosen from the confounding selector of functional block of the reserve system of the downstream near the cel receive section of a test circuit 200 by enabling the individual system selection directions circuit of the upstream one by one after that -- as -- changing -- a trial -- carrying out -- present -- business -- the normality of all the confounding roots from a system to a reserve system is examined. in addition, this example -- setting -- following drawing 8 and drawing 9 -- the same -- the main information -- present -- business -- it can transmit within functional block of the both sides of a system and a reserve system.
[0022] Drawing 8 is the explanatory view showing the 4th example of the configuration concerning this invention of the trial system of the ATM switching system of this invention, and actuation. In this example, the system confoundings 80 and 81 which perform actuation as 1st system confounding of this invention are arranged between each functional block (A#0, A#1, B#0, B#1, C#0, C#1) 1-6 which constitutes an ATM switching system and which was each redundancy-ized. The distribution sections 30-33 for the system confoundings 80 and 81 to transmit a cel to functional block of the downstream of a both system from each ** of upstream functional block (the inside of drawing, D, and publication), As opposed to the cel transmitted from functional block of the upstream of a both system by the identifier in a cel header or information field The main information cel or the trial cel of a reserve system is identified.

Further with directions of the filter directions circuits 130-133 The cel from the both system after the cel filters (F and a publication among drawing) 110-117 which transmit or discard these various cels alternatively, the cel filter 110 - 117 passage is multiplexed, and it is constituted by the multiplexing circuits (M and a publication among drawing) 120-123 transmitted to a lower stream of a river. these system confoundings 80 and 81 -- the setting order of the filter directions circuits 130-133 -- it is -- every cel classification -- each functional block 1-6 -- present -- business -- the transfer propriety of each ** of a system and a reserve system is controlled.

[0023] A test circuit 200 is connected to the functional block 2 and 6 of a reserve system in the example shown in this drawing 8 . The cel filters 110 and 114 on the cel transfer root to the functional block 3 and 5 of a system transmit all cels. present -- business -- from the functional block 1 and 3 of a system -- present -- business -- The filters 111 and 115 on the cel transfer root to the functional block 3 and 5 of a system discard all cels. from the functional block 2 and 4 of a reserve system -- present -- business -- The filters 112 and 116 on the cel transfer root from the functional block 1 and 3 to the functional block 4 and 6 of a reserve system of a system transmit all cels. moreover -- present -- business -- The filters 113 and 117 on the cel transfer root from the functional block 2 and 4 to the functional block 4 and 6 of a reserve system of a reserve system transmit only the trial cel of a reserve system. this -- the main information -- present -- business -- the inside of the functional block 1 of the both sides of a system and a reserve system and 3-6 is transmitted, the inside of the functional block 2 and 4 of a reserve system and 6 is transmitted to the trial cel of a reserve system by coincidence, and it can perform the verification test of the normality of a cel flow of the inside of the functional block 2 and 4 of a reserve system, and 6, and mutual to it.

[0024] Drawing 9 is the explanatory view showing the 5th example of the configuration concerning this invention of the trial system of the ATM switching system of this invention, and actuation. In this example, the system confoundings 82 and 83 which perform actuation as 2nd system confounding of this invention are arranged between each functional block (A#0, A#1, B#0, B#1, C#0, C#1) 1-6 which constitutes an ATM switching system and which was each redundancy-ized. The distribution sections 30-33 for the system confoundings 82 and 83 to transmit a cel to functional block of the downstream of a both system from each ** of upstream functional block like the system confoundings 80 and 81 in drawing 8 (the inside of drawing, D, and publication), As opposed to the cel transmitted from functional block of the upstream of a both system by the identifier in a cel header or information field A system trial cel and the trial cel of a reserve system are identified. the main information cel -- present -- business -- with directions of the filter directions circuits 130-133 further The cel from the both system after the cel filters (F and a publication among drawing) 110-117 which transmit or discard these various cels alternatively, the cel filter 110 - 117 passage is multiplexed, and it is constituted by the multiplexing circuits (M and a publication among drawing) 120-123 transmitted to a lower stream of a river. these system confoundings 82 and 83 -- the setting order of the filter directions circuits 130-133 -- it is -- every cel classification -- each functional block 1-6 -- present -- business -- the transfer propriety of each ** of a system and a reserve system is controlled.

[0025] the example shown in this drawing 9 -- setting -- present -- business -- the functional block 1 and 5 of a system -- present -- business -- the test circuit 201 of a system is connected and the test circuit 200 of a reserve system is connected to the functional block 2 and 6 of a reserve system. The cel filters 110 and 114 on the cel transfer root to the functional block 3 and 5 of a system transmit all cels. and -- present -- business -- from the functional block 1 and 3 of a system -- present -- business -- The cel filters 111 and 115 on the cel transfer root to the functional block 3 and 5 of a system discard all cels. from the functional block 2 and 4 of a reserve system -- present -- business -- The cel filters 112 and 116 on the cel transfer root from the functional block 1 and 3 to the functional block 4 and 6 of a reserve system of a system transmit only the main information cel. moreover -- present -- business -- The cel filters 113 and 117 on the cel transfer root from the functional block 2 and 4 to the functional block 4 and 6 of a reserve system of a reserve system transmit only the trial cel of a reserve system. this -- the main information -- present -- business -- the inside of the functional block 1-6 of the both sides of a system and a reserve system is transmitted -- having -- moreover -- present -- business -- the trial cel of a system -- present -- business -- between each functional block 1 and 3 of a system and 5 is transmitted -- having -- present -- business -- the verification test of the normality of a cel flow of the inside of each functional block 1 and 3 of a system and 5 and mutual can be performed. Moreover, between each functional block 2 and 4 of a reserve system and 6 is transmitted to the trial cel of a reserve system by coincidence, and it can perform the verification test of the normality of a cel flow of the inside of each functional block 2 and 4 and 6, and mutual to it.

[0026] in the above, it explained using drawing 1 - drawing 9 -- as -- the ATM switching system of this example, and the trial system of an ATM network -- present -- business -- without interrupting service of a system, each functional block of a reserve system can be connected, a trial system can be constituted, and various kinds of trials including a continuity check can be carried out. this -- present -- business -- a maintenance test etc. can be performed also during employment of a system, the failure in the reserve system potentiality-ized in many cases can be detected at an early stage conventionally, and a potential hazard can be decreased. moreover, under employment -- present -- business -- an ACT change of as opposed to [also when the claim on the service to functional block of a system arises from a user]

the equipment concerned to carry out -- carrying out -- present -- business -- by carrying out the state transition of the system to a reserve system, and constituting a trial system the testing device which cannot be carried out was used during employment -- present -- business -- the detailed verification test of a system can be performed and it becomes realizable [the quick and detailed cause analysis to a user claim]. Furthermore, the normal sex test of the cel switch-on of the extension PKG which used the reserve system of established functional block which can connect a test circuit at the time of PKG extension which cannot carry out direct continuation of the test circuit etc. becomes possible.
[0027] In addition, this invention is not limited to the example explained using drawing 1 - drawing 9 , and can be variously changed in the range which does not deviate from the summary. For example, although this example explains using the ATM switching system which consists of three functional block, this invention is applicable also to the ATM switching system and ATM network which are constituted by functional block of the number of arbitration other than this. Moreover, although this example explains the ATM network using the ATM network which consists of the two exchanges or transmission equipment which are shown by drawing 1 - drawing 3 , this invention is applicable also to the ATM network constituted by a number of arbitration of the exchanges or transmission equipment shown by drawing 6 - drawing 9 .
[0028]
[Effect of the Invention] without it interrupts the service under employment according to this invention -- present -- business -- under prevention of failure generating by early detection of the failure which could perform a cel continuity check, a maintenance test, etc. of a system and a reserve system, and has been potentiality-ized in the reserve system, and employment -- present -- business -- the quick and detailed cause analysis by the detailed verification test to the claim from the user in a system etc. is attained, and the dependability and the engine performance of an ATM switching system and an ATM network improve.

[Translation done.]

TECHNICAL FIELD

[Industrial Application] the trial system of the ATM switching system and ATM network with which this invention performs the transfer by the Asynchronous Transfer Mode (Asynchronous TransferMode, the following, ATM, and publication) -- being involved -- especially -- present -- business -- it is related with the trial system of a suitable ATM switching system to perform efficiently the trial of the ATM switching system redundancy-ized by the system and the reserve system and an ATM network, and an ATM network.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the explanatory view showing the 1st example of the configuration concerning this invention of the trial system of the ATM switching system of this invention, and actuation.
[Drawing 2] It is the explanatory view showing other examples of a configuration and examples of operation concerning this invention of the trial system of the ATM switching system in drawing 1 .
[Drawing 3] It is the explanatory view showing the 2nd example of the configuration concerning this invention of the trial system of the ATM switching system of this invention, and actuation.
[Drawing 4] It is the explanatory view showing the 1st example of the configuration concerning this invention of the trial system of the ATM network of this invention, and actuation.
[Drawing 5] It is the explanatory view showing the 2nd example of the configuration concerning this invention of the trial system of the ATM network of this invention, and actuation.
[Drawing 6] It is the explanatory view showing one example of the 3rd example of the configuration concerning this invention of the trial system of the ATM switching system of this invention, and actuation.
[Drawing 7] It is the explanatory view showing other examples of the 4th example of the configuration concerning this invention of the trial system of the ATM switching system of this invention, and actuation.
[Drawing 8] It is the explanatory view showing the 5th example of the configuration concerning this invention of the trial system of the ATM switching system of this invention, and actuation.
[Drawing 9] It is the explanatory view showing the 6th example of the configuration concerning this invention of the trial system of the ATM switching system of this invention, and actuation.
[Drawing 10] It is the explanatory view showing the example of a configuration and actuation of the redundancy-ized conventional ATM switching system.
[Description of Notations]
1-12 Functional block
20 21 System confounding
30-33 Distribution section
40, 40a, 41, 41a The exchange or transmission equipment
50-57 Confounding selector
70 71 System selection directions circuit
80-83 System confounding
100-107,100a-103a, 100b-103b Individual system selection directions circuit
110-117 Cel filter
120-123 Multiplexing circuit
130-133 Filter directions circuit
150 151 Transmission line
200-203 Test circuit

[Translation done.]

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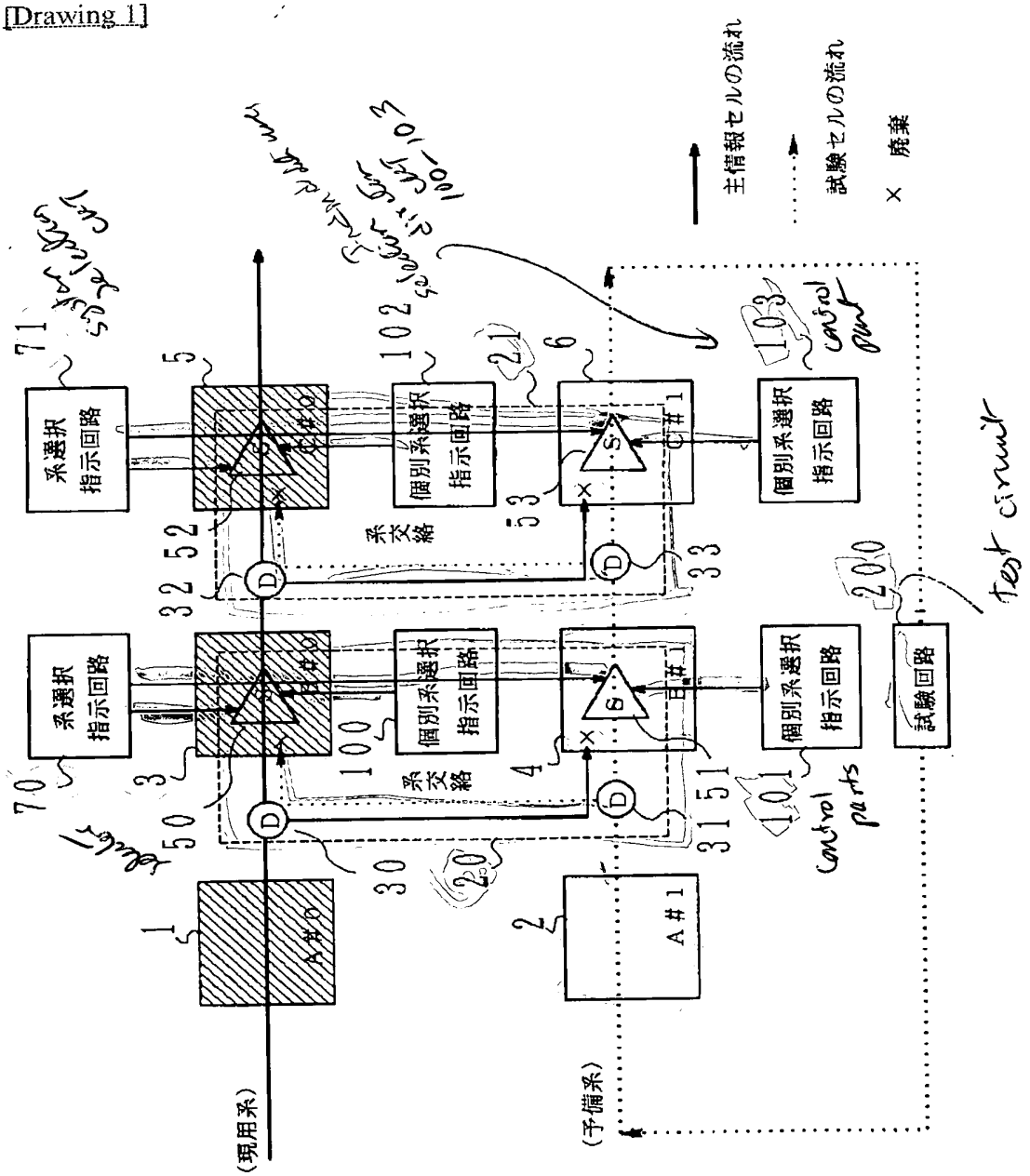
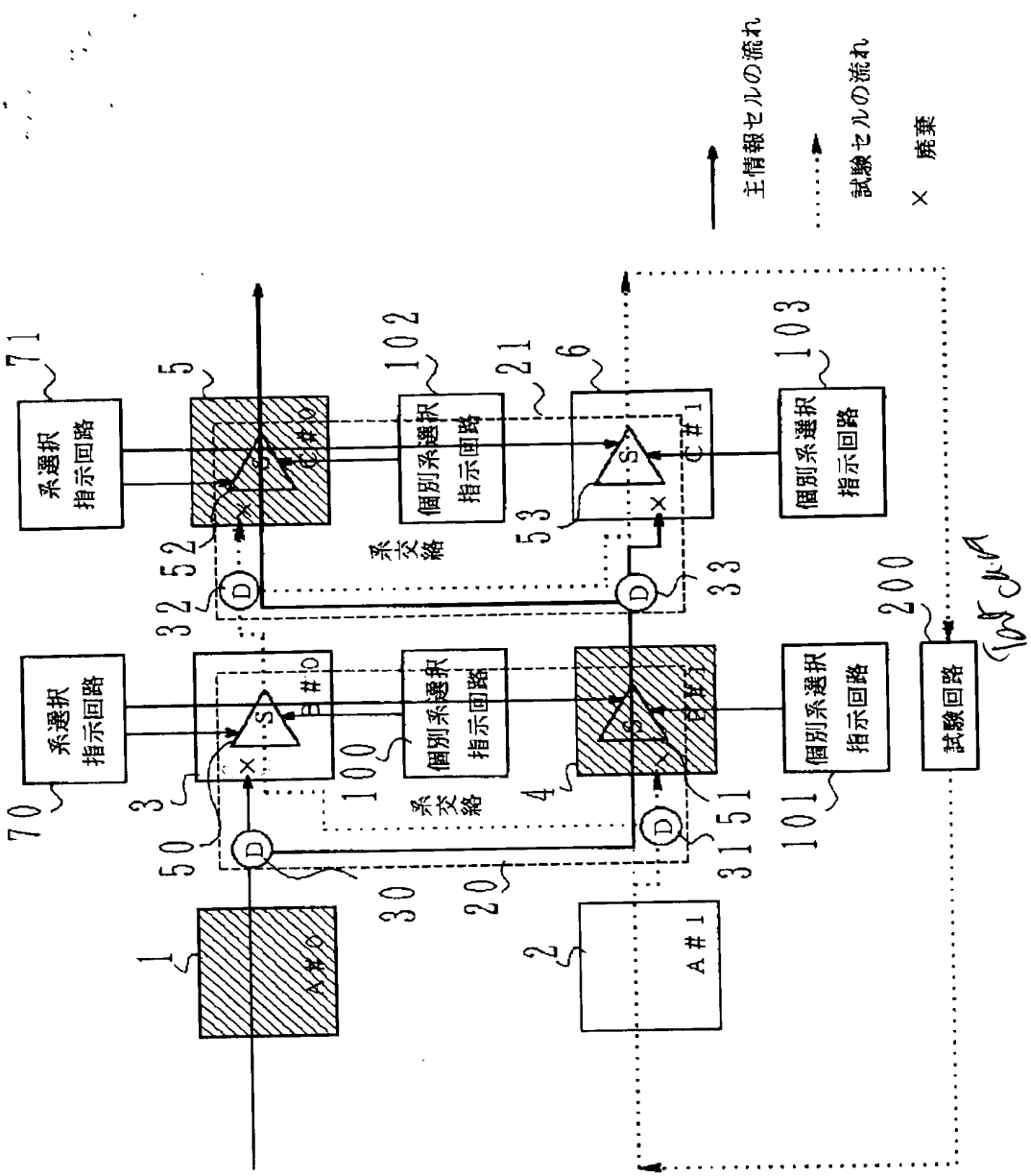
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



[Drawing 2]


主情報セルの流れ
試験セルの流れ
× 廃棄
A#0
A#1
A#10
A#11
S
D
系選択指示回路
個別系選択指示回路
系交絡
試験回路
1
2
3
4
5
6
20
21
30
31
32
33
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51
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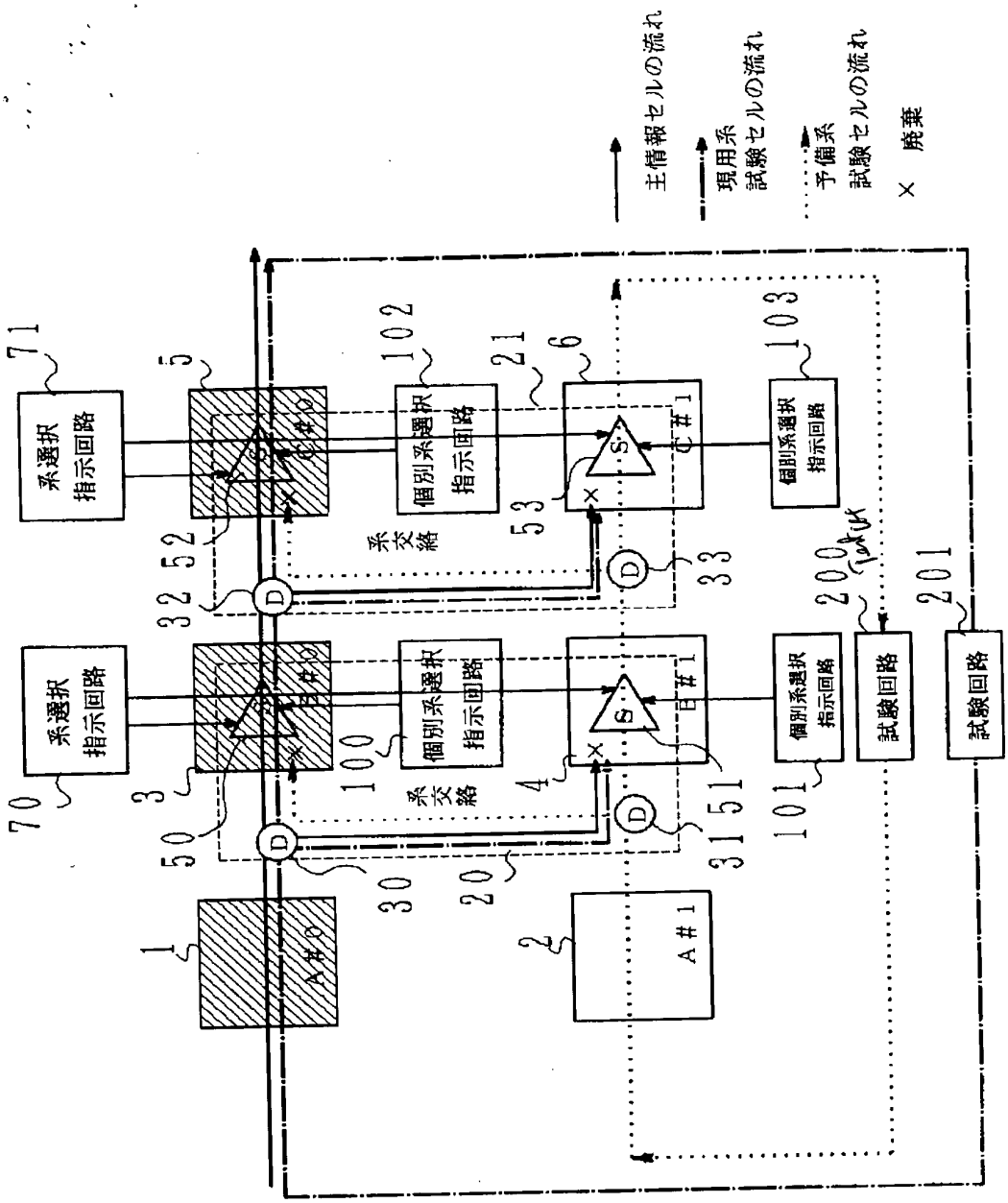
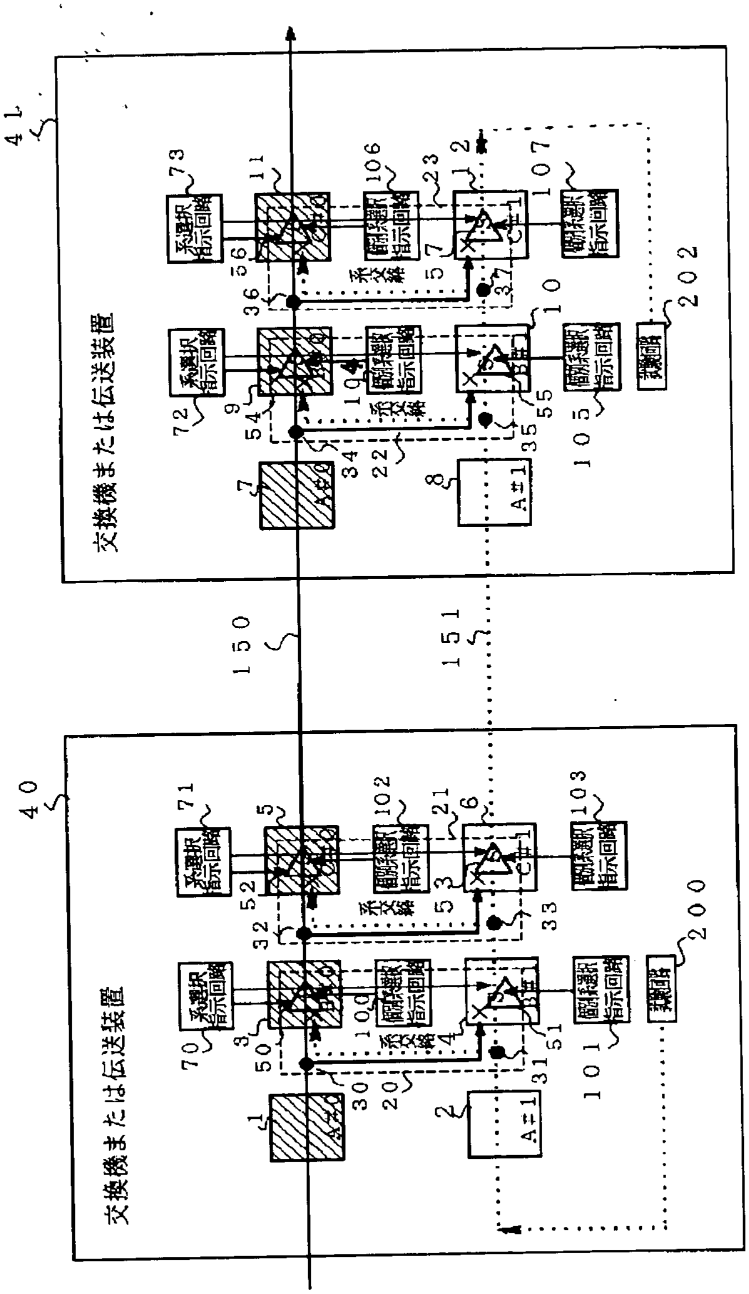
53
70
71
100
101
102
103
200

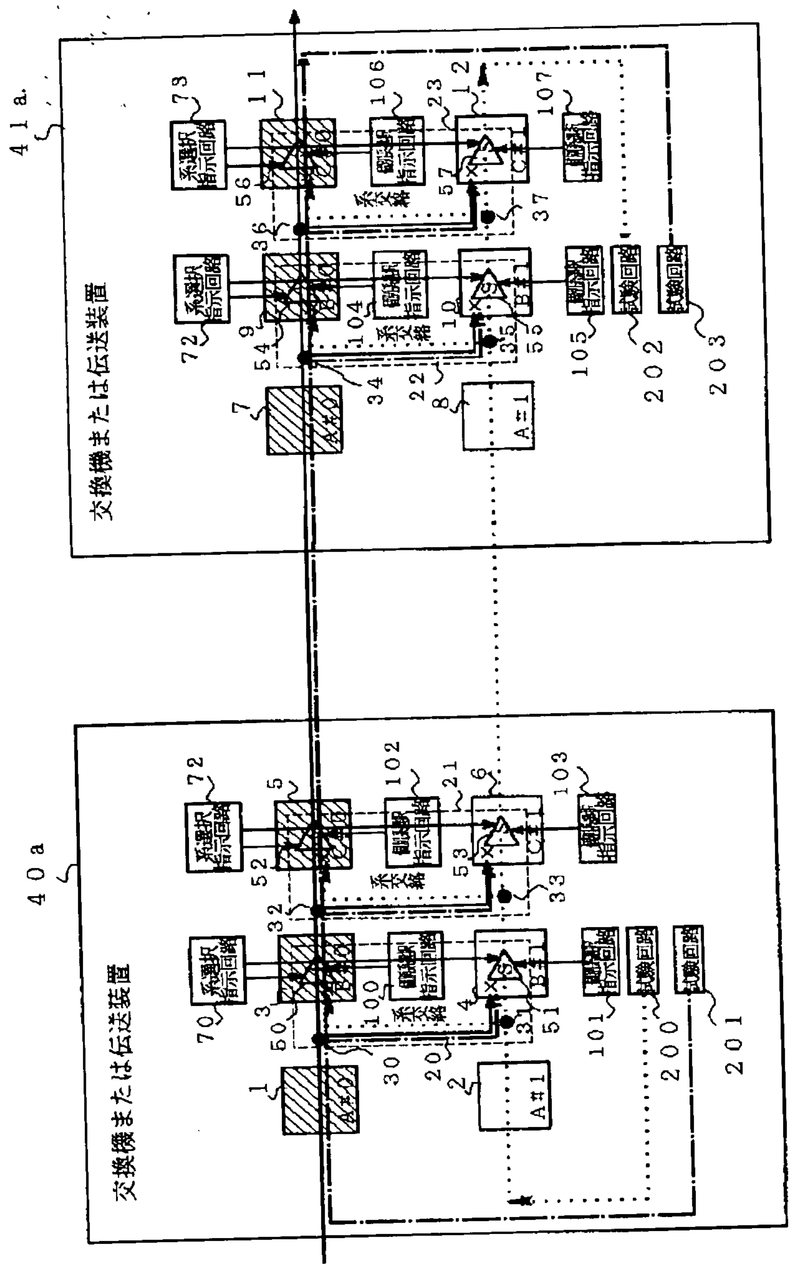
[Drawing 3]


主情報セルの流れ
現用系
試験セルの流れ
予備系
試験セルの流れ
× 廃棄
系選択
指示回路
個別系選択
指示回路
系交絡
試験回路
A#0
A#1
B#0
B#1
C#1
D
S

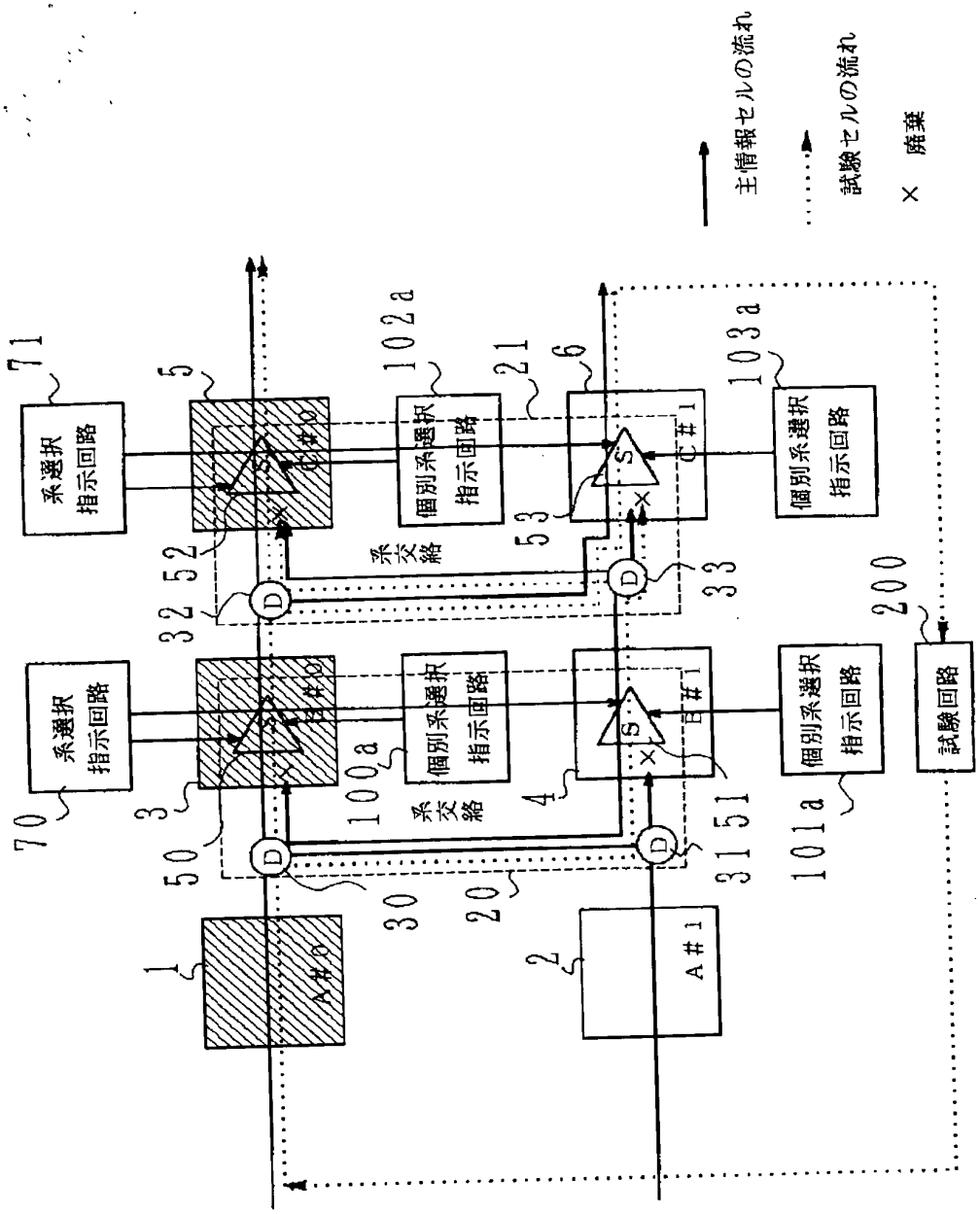
[Drawing 4]


交換機または伝送装置
交換機または伝送装置
系選択指示回路
個別系選択指示回路
系交絡
A#0
A#1
40
41
150
151

[Drawing 5]



[Drawing 6]


主情報セルの流れ
試験セルの流れ
× 廃棄
系選択指示回路
個別系選択指示回路
系交絡
試験回路
A#0
A#1
B#0
B#1
S
D
70
71
1
2
3
4
5
6
20
21
30
31
32
33
50
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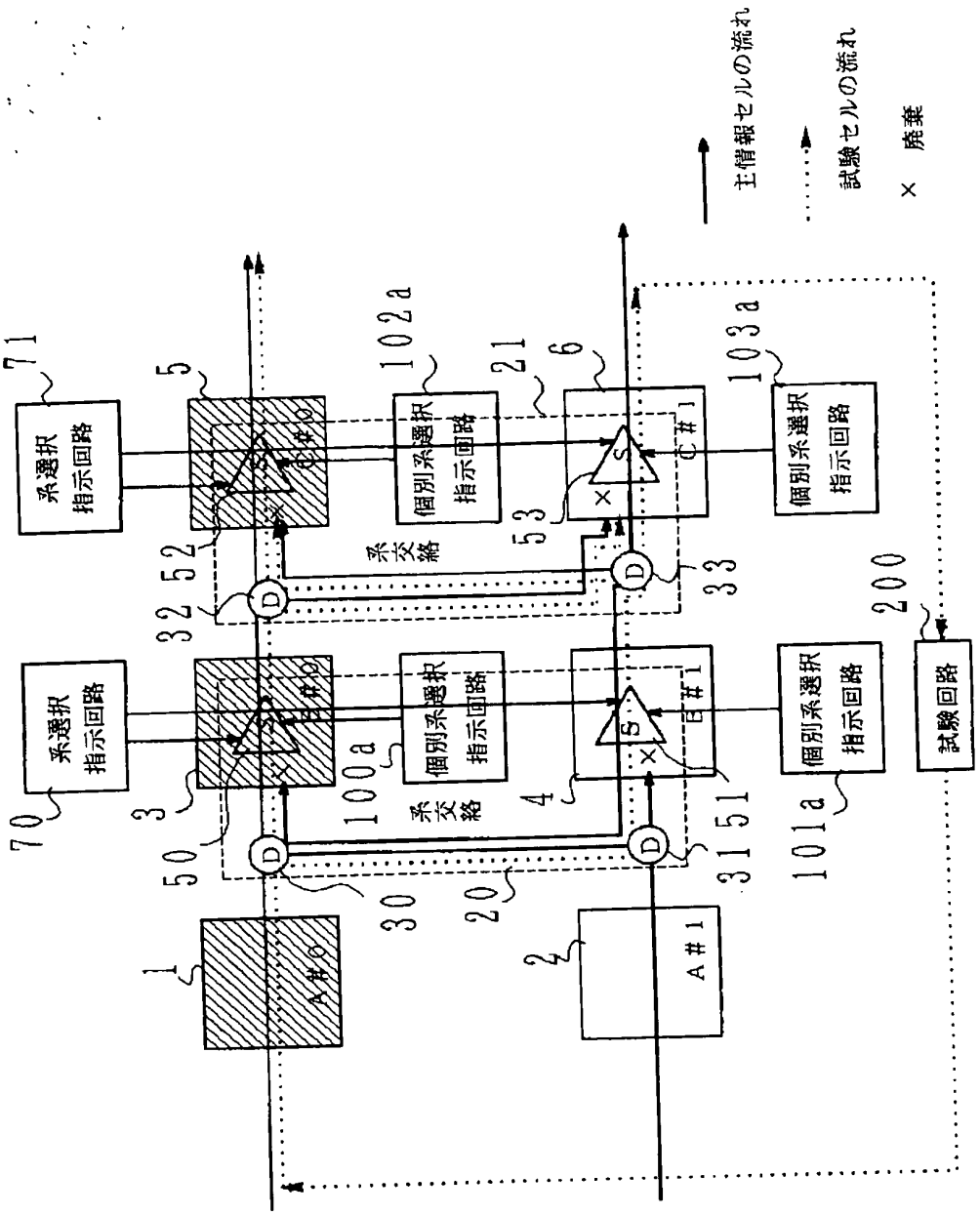
53
100a
101a
102a
103a
200

[Drawing 7]


主情報セルの流れ
試験セルの流れ
× 廃棄
系選択指示回路
個別系選択指示回路
系交錯
A#0
A#1
B#0
B#1
C#0
C#1
D
S
試験回路
70
71
1
2
3
4
5
6
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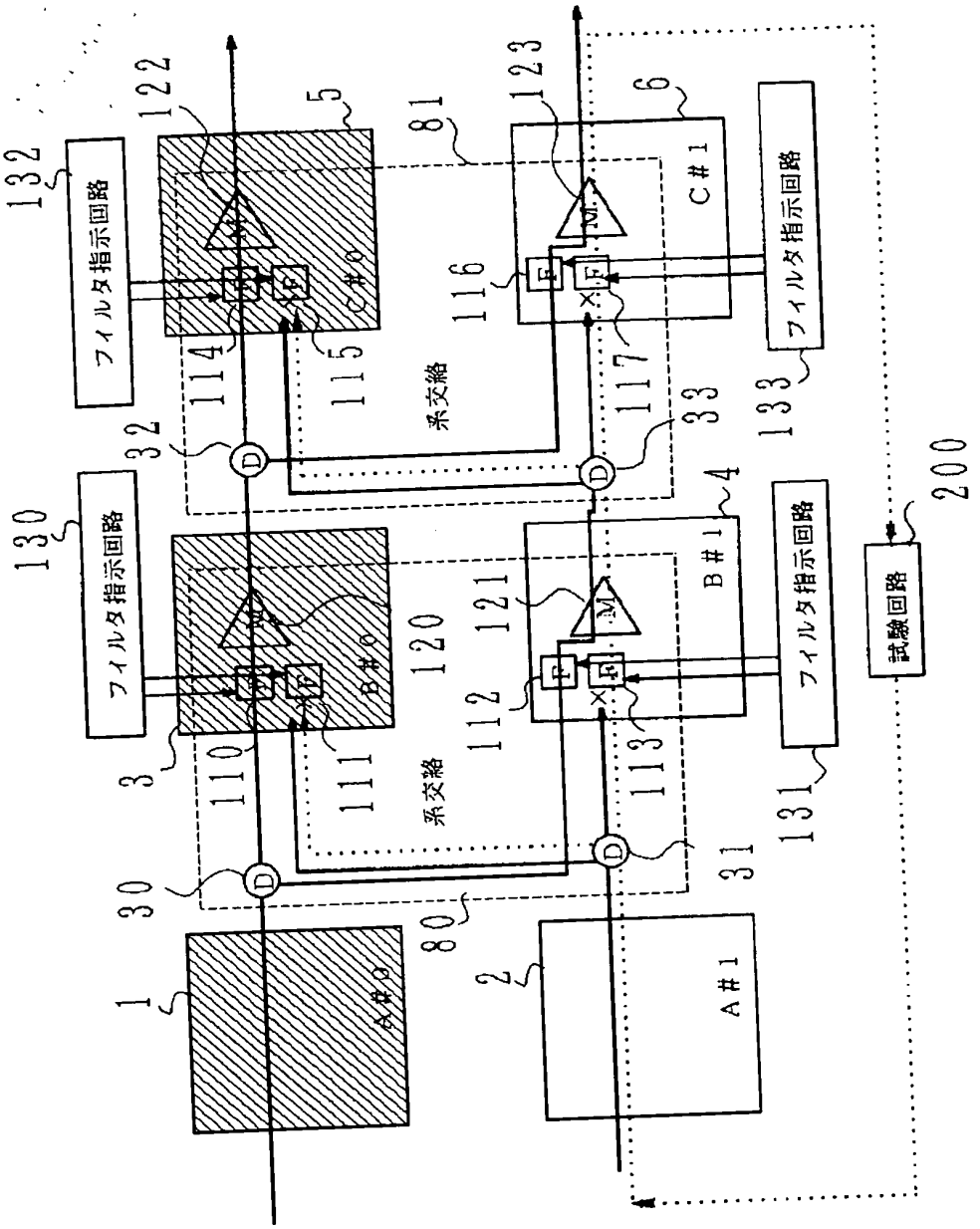
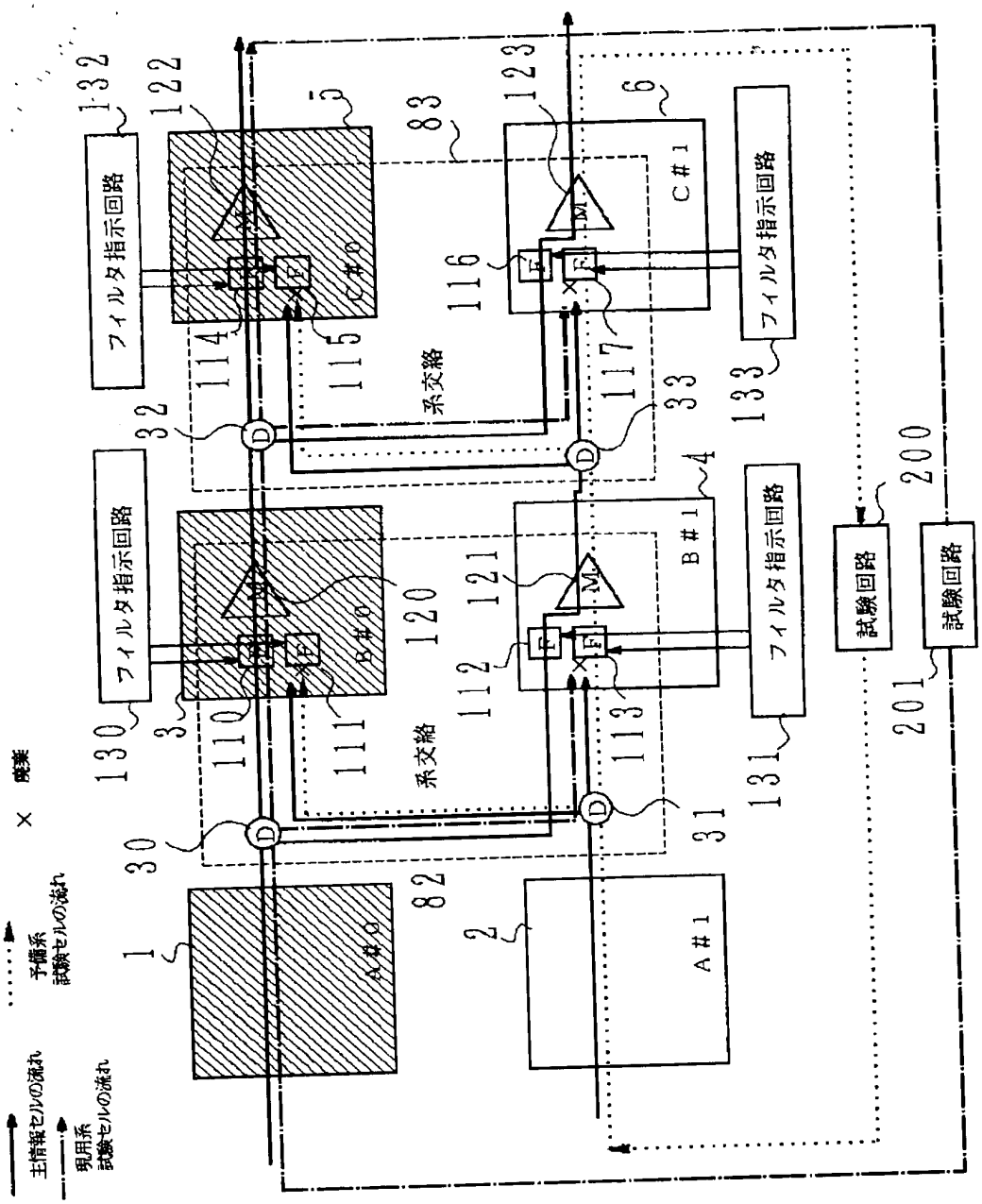
50
51
52
53
100a
101a
102a
103a
200

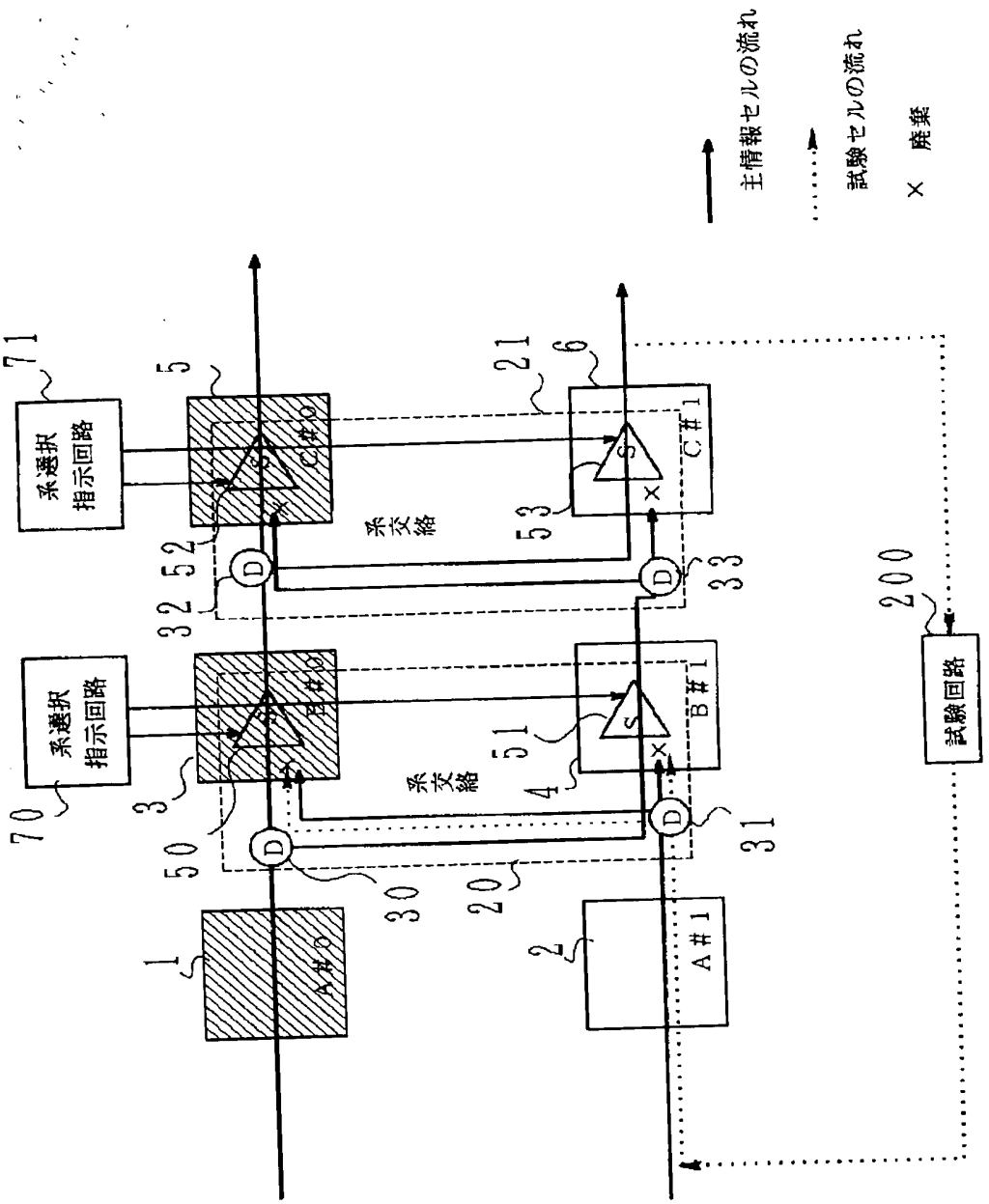
[Drawing 8]


フィルタ指示回路
フィルタ指示回路
フィルタ指示回路
フィルタ指示回路
フィルタ指示回路
試験回路
A#0
A#1
B#0
B#1
C#0
C#1
系交絡
系交絡
D
M
F
200

[Drawing 9]


主情報セルの流れ
予備系
試験セルの流れ
廃棄
現用系
試験セルの流れ
フィルタ指示回路
系交絡
試験回路
A#0
A#1
B#0
B#1
C#0
C#1

[Drawing 10]



[Translation done.]

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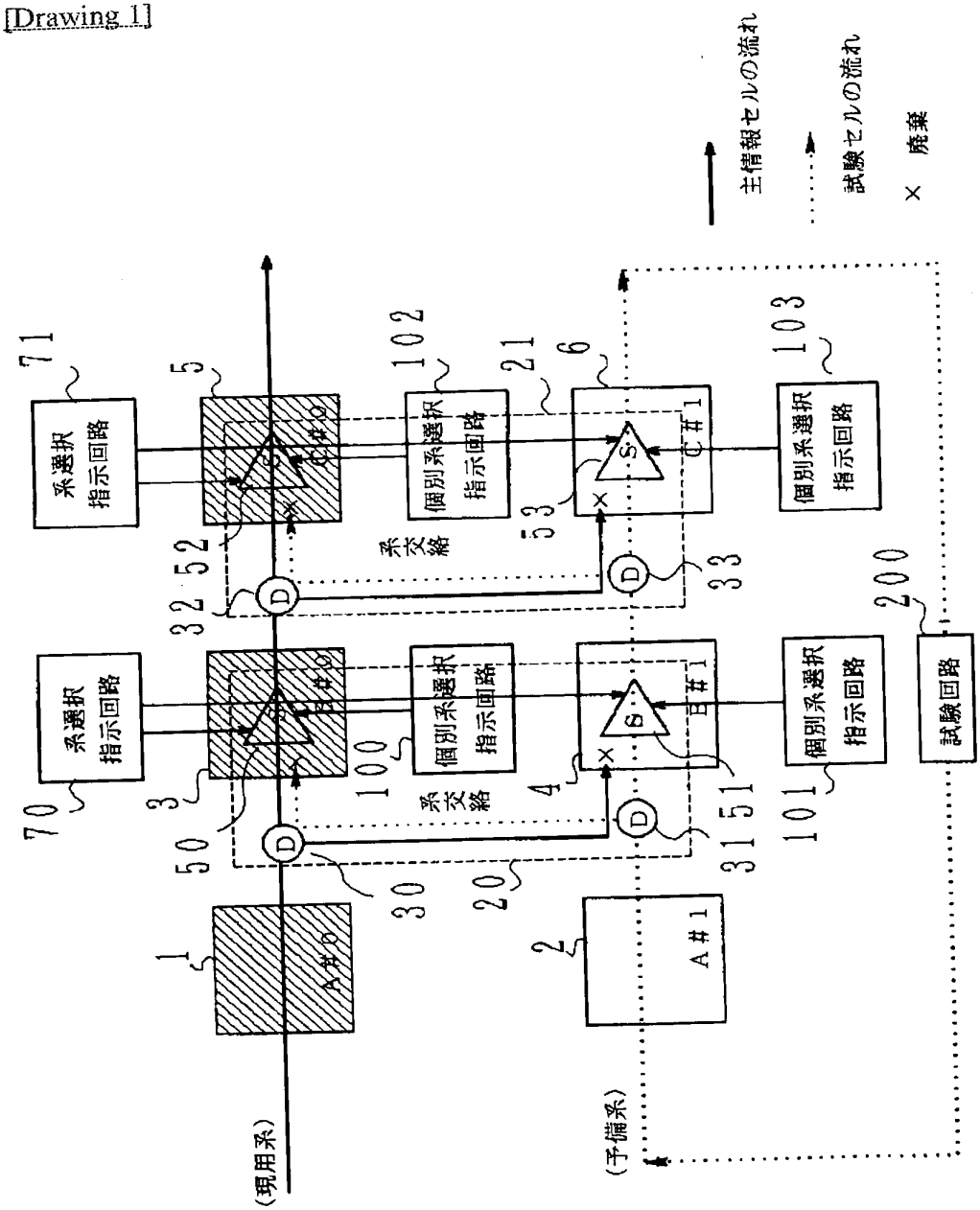
DRAWINGS

[Drawing 1]



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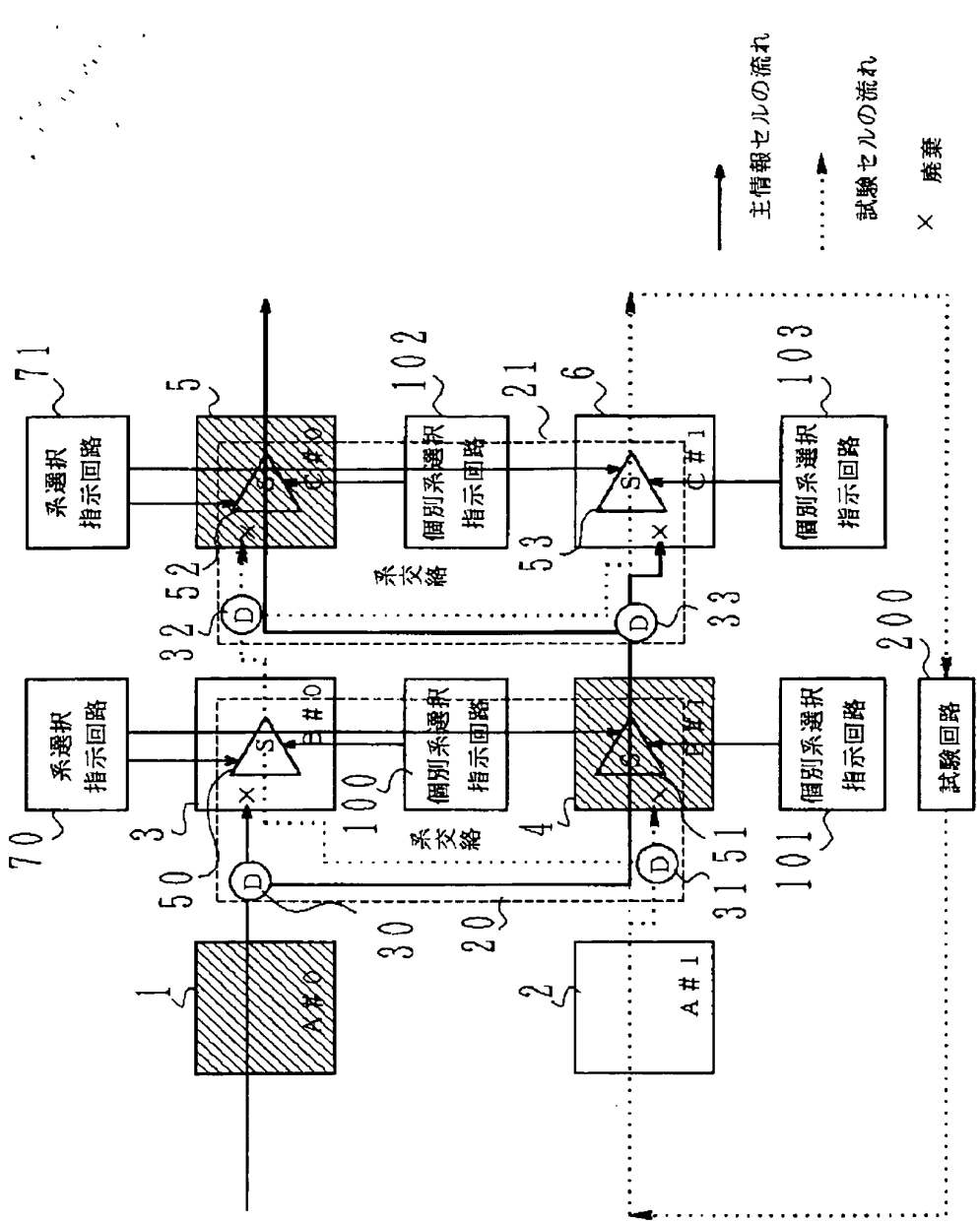
主情報セルの流れ
試験セルの流れ
× 廃棄
系選択指示回路
個別系選択指示回路
系交絡
A#0
A#1
B#0
B#1
S
D
試験回路
70
71
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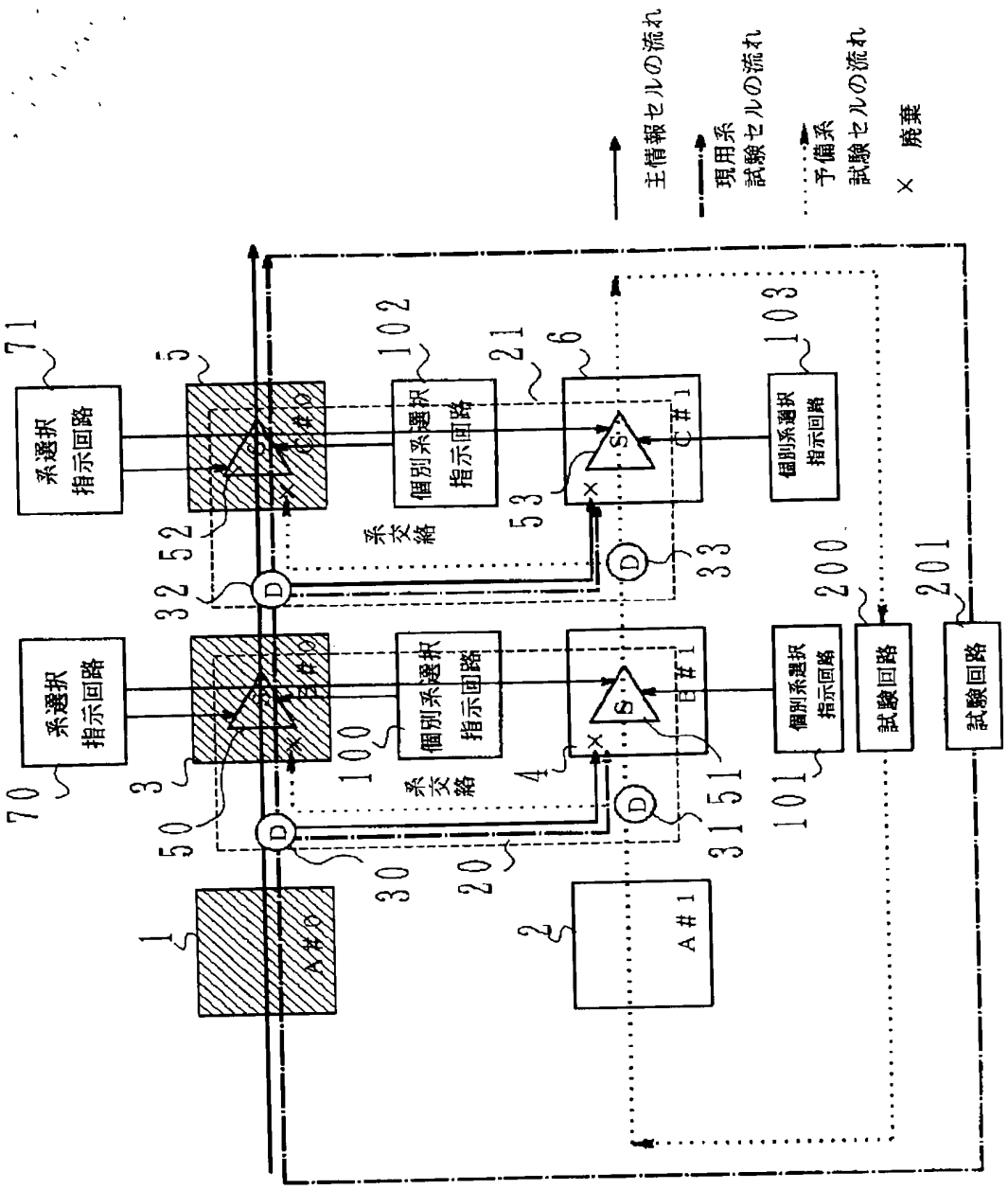
100
101
102
103
200

[Drawing 3]


主情報セルの流れ
現用系
試験セルの流れ
予備系
試験セルの流れ
× 廃棄
系選択
指示回路
個別系選択
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試験回路
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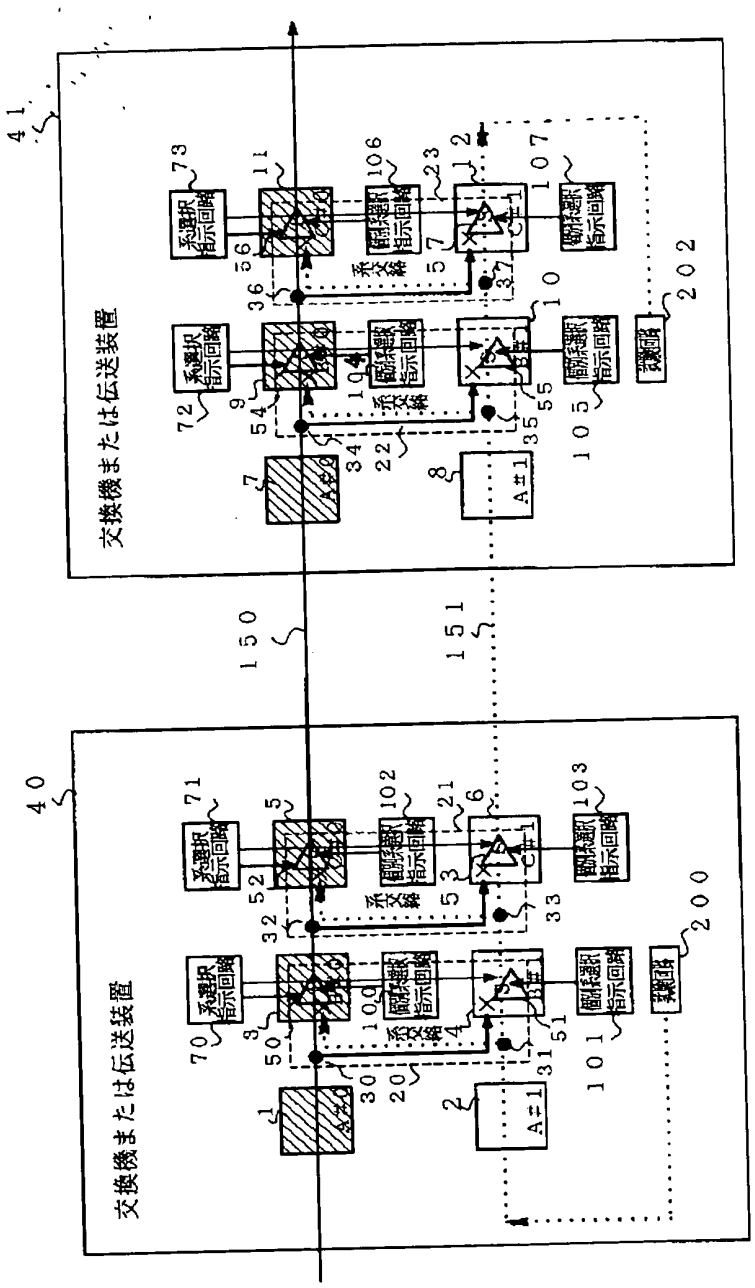
A#1
B#0
B#1
S
D

[Drawing 4]


交換機または伝送装置
交換機または伝送装置
系選択指示回路
副系選択指示回路
系交絡
予備回路
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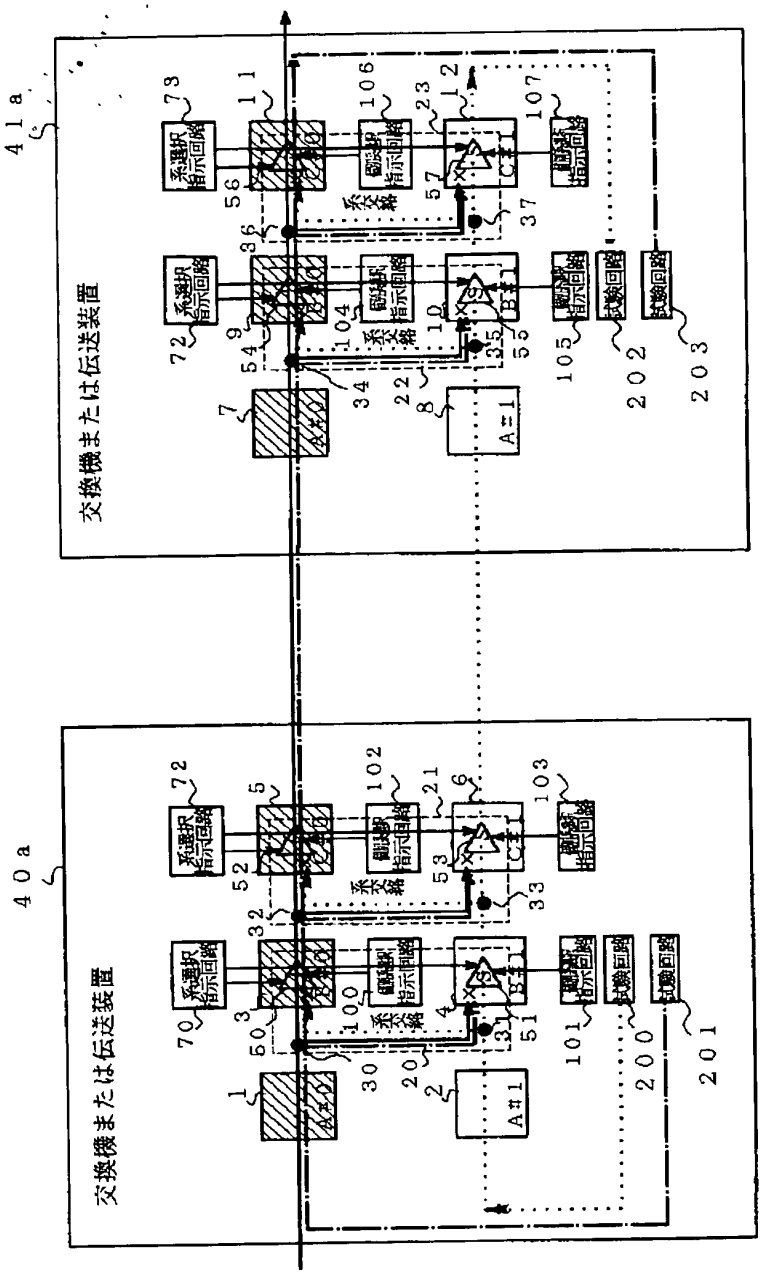
B=1
40
41
150
151
200
202

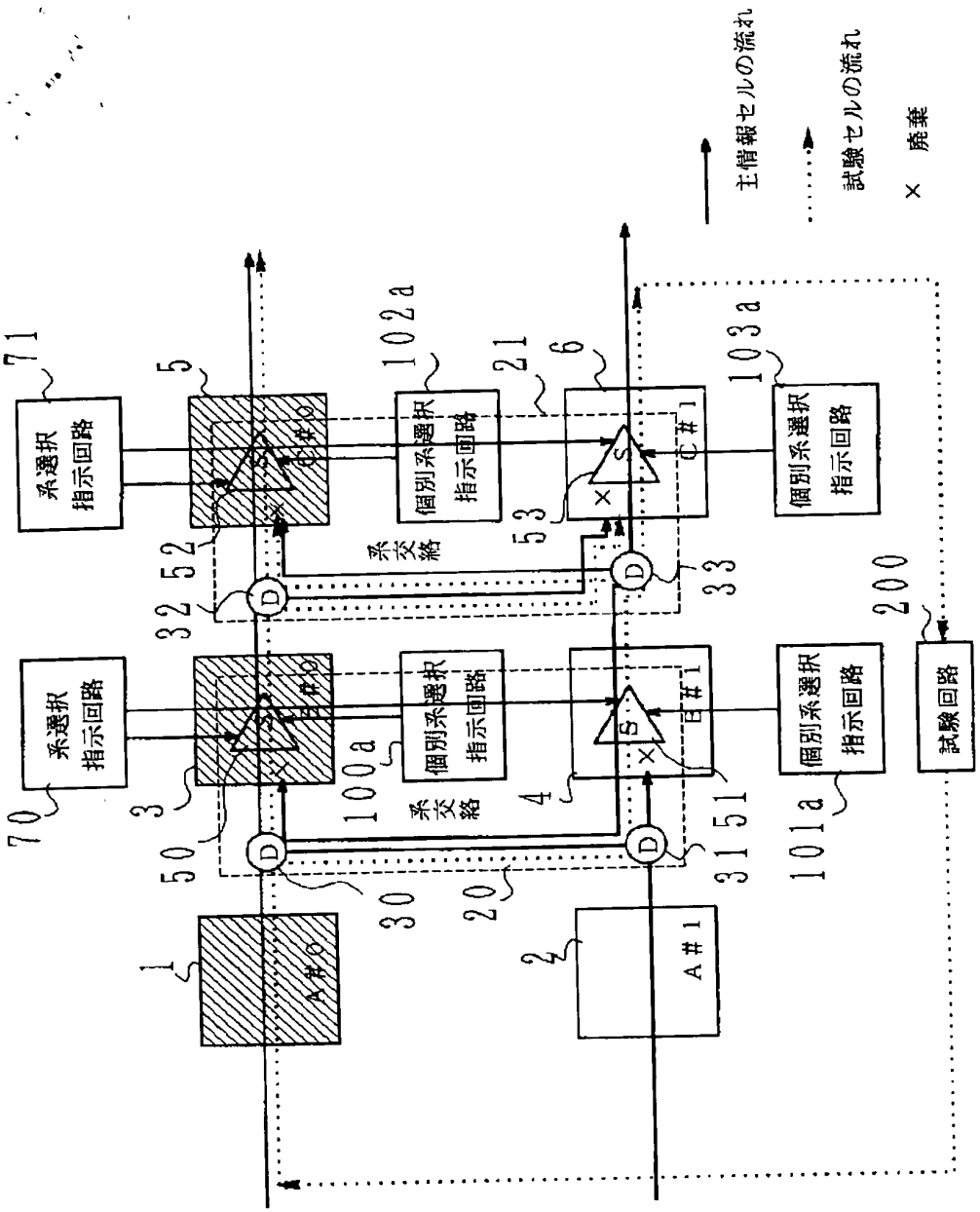
[Drawing 5]



[Drawing 6]

主情報セルの流れ
試験セルの流れ
× 廃棄
系選択指示回路
個別系選択指示回路
系交絡
試験回路
A#0
A#1
B#0
B#1
C#0
C#1
D
S
×

[Drawing 7]


主情報セルの流れ
試験セルの流れ
× 廃棄
系選択指示回路
個別系選択指示回路
系交絡
試験回路
A#0
A#1
B#0
B#1
C#0
C#1
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103a
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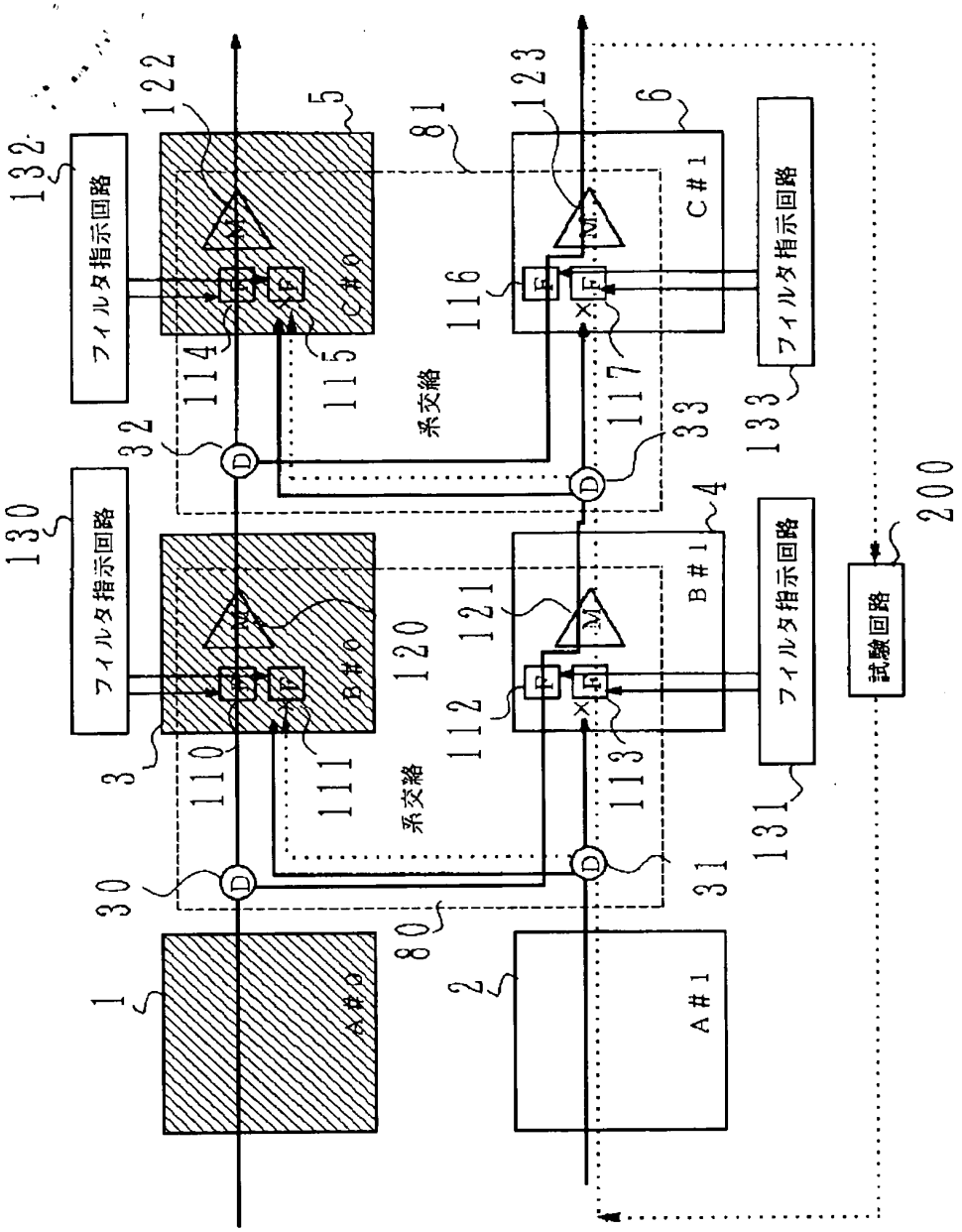
[Drawing 8]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フィルタ指示回路
フィルタ指示回路
フィルタ指示回路
試験回路
A#0
A#1
B#0
B#1
C#0
C#1
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系交絡
130
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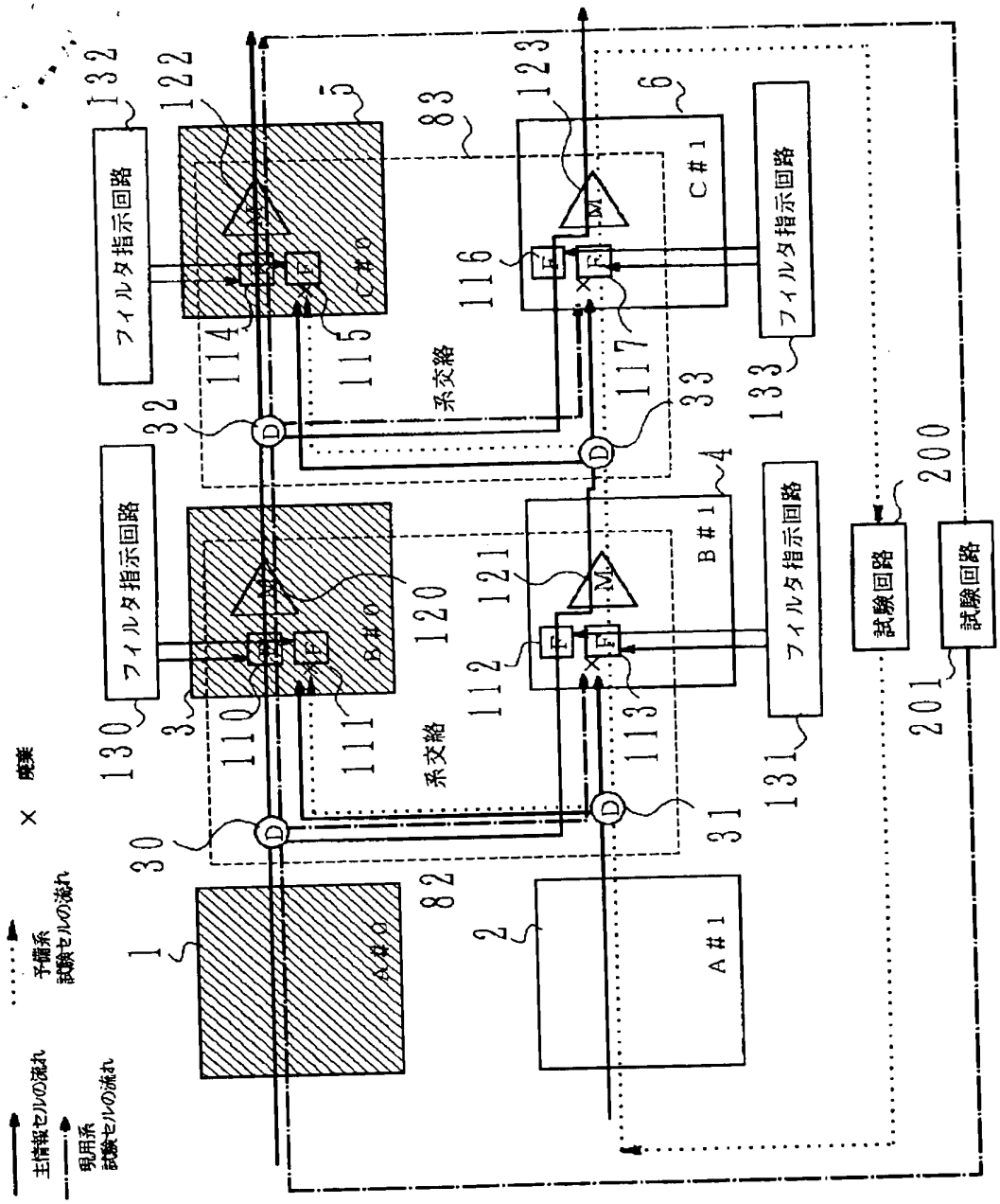
[Drawing 9]


主情報セルの流れ
現用系試験セルの流れ
予備系試験セルの流れ
廃棄
A#0
A#1
B#0
B#1
C#0
C#1
系交絡
系交絡
フィルタ指示回路
フィルタ指示回路
フィルタ指示回路
フィルタ指示回路
試験回路
試験回路
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82
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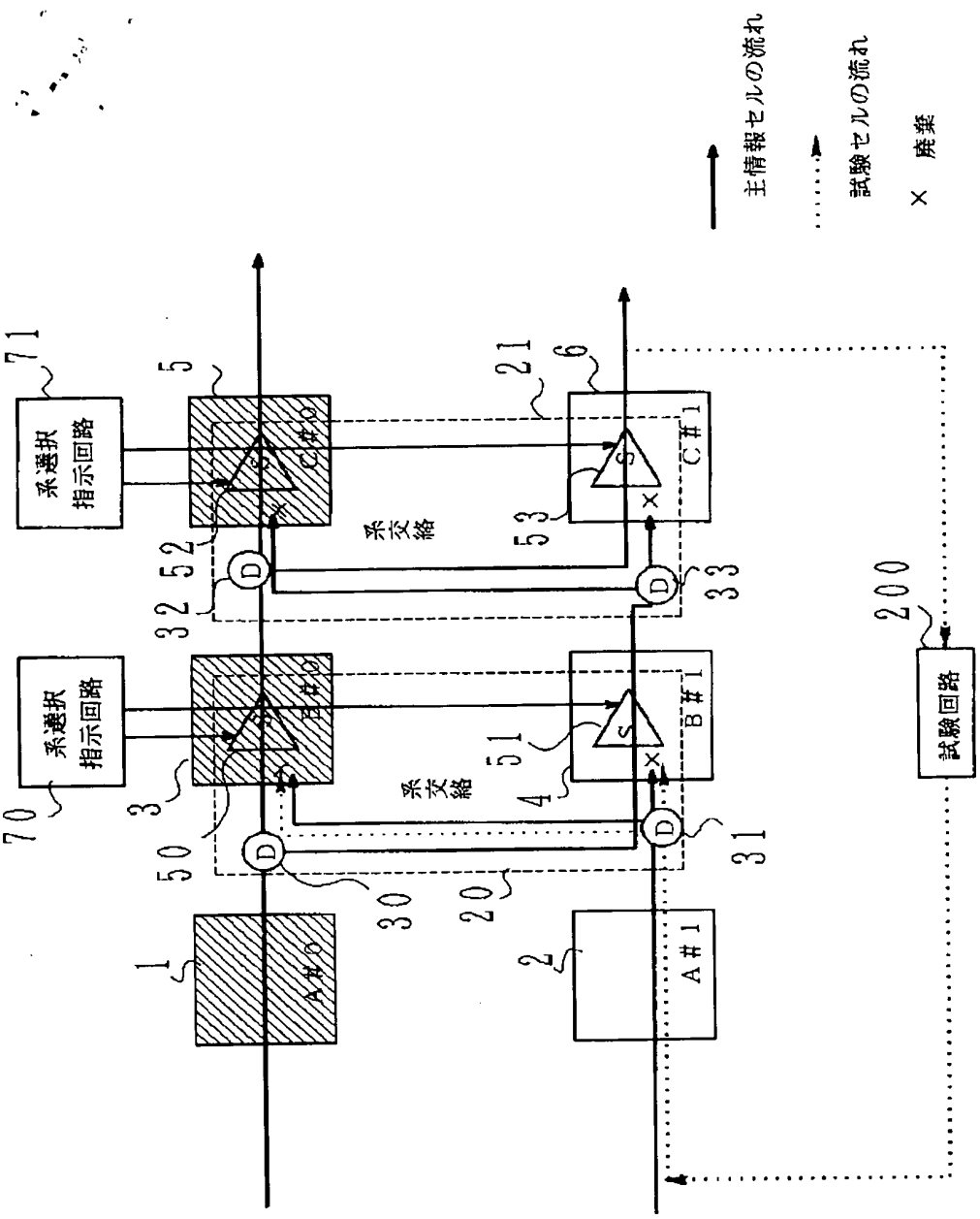
[Drawing 10]



[Translation done.]